Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:	)	
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147
	)	
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)	CC Docket No. 96-98

REPLY OF GTE

GTE Service Corporation and its affiliated domestic communications companies[1] ("GTE") respectfully submit their reply to certain issues raised in responses to the petitions for reconsideration of the Commission's Line Sharing Order.[2] GTE demonstrates below that (1) CLECs do not need physical access to the entire loop for testing purposes in order to assure quality DSL service, and (2) the Commission should presume that any loop longer than 18,000 feet cannot be conditioned without causing material degradation to voice transmission quality.[3]

[1] GTE Alaska, Incorporated, GTE Arkansas Incorporated, GTE California Incorporated, GTE Florida Incorporated, GTE Hawaiian Telephone Company Incorporated, The Micronesian Telecommunications Corporation, GTE Midwest Incorporated, GTE North Incorporated, GTE Northwest Incorporated, GTE South Incorporated, GTE Southwest Incorporated, Contel of Minnesota, Inc., GTE West Coast Incorporated, and Contel of the South, Inc.

[2] Deployment of Wireline Services Offering Advanced Telecommunications Capability, Third Report and Order, CC Docket No. 98-147 and Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Fourth Report and Order, CC Docket No. 96-98, FCC 99-355 (rel. Dec. 9, 1999) ("Line Sharing Order" or "Order").

[3] For the reasons given in its comments, GTE continues to urge the Commission to

(Continued...)

CLECs do not require physical access to the entire loop for testing purposes. Certain CLECs contend that they need access to the entire loop for testing purposes (that is, to perform "metallic loop testing") in order to assure that they can provide high quality DSL service.[4] This is incorrect.[5]

First, contrary to Northpoint's assertions, CLECs do not need physical access to the metallic loop in order to detect load coils and bridged taps. Tests to determine the presence of these devices require the application of frequencies to the loop facility and the measurement of energy reflections. These tests can be performed from the CLEC's point of collocation, using test heads located in the CLEC's controlled space, without physical access to the loop. Rather, equipment such as Siecor POTS splitters utilizing DC blocking capacitors can perform these tests (including but not limited to load coil,

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(...Continued)
permit market forces rather than state regulation to determine the disposition of existing, interfering technologies such as AMI T1, and to remove the presumption that any technology successfully deployed in one state should be presumed deployable throughout the country, regardless of the characteristics of local networks.

[4] *See, e.g.*, Northpoint at 11-12 ("a competitive LEC requires access to the entire loop in order to detect and locate bridge taps and load coils" and "to obtain the electrical signature needed to recognize modems, phones, and microfilters on the line"); MCI WorldCom at 4 ("A diagnostic test of only the high frequency portion of the loop does not provide data regarding all loop characteristics necessary to troubleshoot, repair or maintain a customer's data service in a line sharing scenario"). Citations are to filings made in these dockets on March 22, 2000, unless otherwise indicated.

[5] Given the technical nature of these reply comments, GTE attaches two declarations attesting to the accuracy of the matters discussed herein. *See* Declaration of Daniel B. Burch (Att. 1 hereto); Declaration of Percy E. Pool (Att. 2 hereto).

bridge tap, gain slope, and insertion loss) above the 4kHz voice band – that is, without interrupting lifeline POTS service.[6]

Nor is physical access to the loop needed to obtain the electrical signature of modems, phones, and microfilters. CLECs can perform tests to obtain the necessary signature information using GTE's 4-Tel testing system, which is the same loop testing system that GTE uses to maintain its loop plant. The 4-Tel system provides all necessary loop characteristic information, including AC/DC, insulation/conductor leakage, balance, noise, resistive fault, conductance, and length. These measurements are available to CLECs on a per-line basis via the Wholesale Internet Service Engine ("WISE") interface to 4-Tel.

The 4-Tel system has been successfully tested with leading data CLECs. As part of the California line sharing trial, Covad, Northpoint, and Rhythms NetConnections were invited to a demonstration of GTE's 4-Tel loop testing capabilities, and Rhythms and Covad participated in the demonstration. The ensuing report concluded that the demonstration was a success: "[a]ll parties to the demonstration indicated their satisfaction that the 4-Tel equipment will provide the necessary test data in a Shared Line scenario."[7]

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[6] The ADSL splitter utilized in GTE's network contains a capacitor in series with the xDSL input for both Tip & Ring conductors. The purpose of this passive device is to block DC currents from the input section of the DSLAM and protect the POTS line from physical fault conditions at or near the DSLAM.

[7] GTE California Line Sharing Trial - Report on 4-Tel Demonstration in Del Rey Central Office - March 16, 2000. As part of this trial, CLECs were given the opportunity to perform tests from their point of collocation though the GTE splitter. They elected, however, to perform such testing at a later date.

Given the availability of these non-intrusive alternatives, the Commission should re-visit its finding that CLEC access to the underlying loop facility is required. Providing high frequency/baseband (voice frequency) testing without DC blocking would disrupt lifeline POTS service. There is no legitimate basis for incurring the attendant risk and inconvenience to voice customers.

<u>The Commission should presume that long loops cannot be conditioned without materially degrading voice service</u>. In its Comments, GTE supported Bell Atlantic's request for reconsideration regarding loops longer than 18,000 feet.[8] As GTE explained, industry-wide engineering practices call for no more than 8 dB loss on voice loops, a level that generally cannot be achieved on long loops without employing devices such as load coils. AT&T and MCI WorldCom nonetheless argue that the current rule, which requires ILECs to demonstrate that conditioning a long loop would impair voice quality, should be retained. MCI WorldCom claims (without citing any technical references) that voice can be provided without significant degradation on conditioned loops up to 20,000 feet.[9] For its part, AT&T states (again without supporting references) that 8.5 dB should be the benchmark for degradation and that ILECs often use larger gauge feeder in long loops, producing quality voice service without loading.[10]

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[8] GTE at 4.

[9] MCI WorldCom at 6.

[10] AT&T at 13.

GTE certainly agrees that degradation is a subjective issue. AT&T's and MCI WorldCom's unsupported statements, however, fail to recognize engineering realities. For example, a 24-gauge, 18,000 foot, unloaded loop would have a loss of 7.9 dB. At 20,000 feet, the loss on an unloaded loop would be 8.8 dB, a significant degradation. If the 20,000 foot loop had been loaded according to proper engineering rules, it would have had a loss of only 4.6 dB. Conditioning that loop would cause degradation of 91 percent. Network design criteria since the days of the Bell System call for loss of no more than 8 dB on local loops, and the nation's entire network is designed to meet this standard. For this reason, AT&T (Bell System) Practices 901-350-202 and 902-115-100 required that all loops longer than 18,000 feet be loaded.[11] These specifications remain in effect today, as provided in the Telcordia (previously Bellcore) Technical Interface Reference Manual.

GTE does not dispute that, in some cases, unloaded loops longer than 18,000 feet may be able to support quality voice service. The nation's local telephone networks, however, have been engineered for many years in a manner that requires loading on long loops. Consequently, in the vast majority of cases, conditioning those loops for DSL would materially degrade voice transmission quality. Under these circumstances, the Commission should grant Bell Atlantic's request for a presumption

[11] *See* Bell System Center for Technical Education, "Telecommunications Transmission Engineering, Volume 2 - Facilities" (1st ed. 1977) at 63-67 (Attachment 3 hereto).

that loops longer than 18,000 feet cannot be conditioned without unreasonably jeopardizing high quality voice service.

Respectfully submitted,

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By: ______________________

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April 3, 2000

ATTACHMENT 1
DECLARATION OF DANIEL B. BURCH

DECLARATION

My name is Daniel B. Burch. My business address is 545 East John Carpenter Freeway, Irving, Texas 75062. I am employed by GTE Network Services as a Manager-HQ Network Reliability Support.

Since 1981, I have held many positions in GTE in which I was responsible for network engineering, construction and maintenance. During my tenure with GTE I have obtained experience in circuit design, station installation procedures, central office service supervision, central office modernization, and outside plant modernization. I have also managed the development of loop access product and feature requirements, development and introduction of new loop access technologies, and managed development of procedures for the introduction of new products, including remote test systems. In my current position I am responsible for the implementation of GTE's policies related to testing of loop access and transport unbundled network elements (UNE).

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 30, 2000.

Daniel B. Burch

Daniel B. Burch

ATTACHMENT 2

DECLARATION OF PERCY E. POOL

DECLARATION

My name is Percy E. Pool. My business address is 545 East John Carpenter Freeway, Irving, Texas 75062. I am employed by GTE Network Services as a Designer - Access/Transmission Support Expert.

Since 1969, I have held many positions in GTE in which I was responsible for network engineering. During my tenure with GTE I have obtained experience in circuit design, station installation procedures, central office modernization, and outside plant modernization. I have also been involved in the development of loop access product and feature requirements, development and introduction of new loop access technologies, and the procedures for the introduction of new products.

In my current position I am responsible for practices and procedures dealing with noise mitigation, inductive coordination, local loop transmission and the electrical protection of central offices, outside plant and customer stations for GTE Network Services. I am currently a Licensed Professional Engineer in the State of Texas.

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 31, 2000.

Percy E. Pool, P.E.

ATTACHMENT 3

EXCERPT FROM
"TELECOMMUNICATIONS TRANSMISSION ENGINEERING"

Telecommunications Transmission Engineering

Volume 2—Facilities

First Edition

Technical Personnel
American Telephone and Telegraph Company,
Bell Telephone Companies,
and
Bell Telephone Laboratories

Bell System Center for Technical Education

Chapter 3

Loops and Station Sets

A loop and the associated station set are uniquely related to the communication service received by an individual customer. Since the same loop and station set are common to every connection to that station set, their performance has a direct effect on service to that customer and the cost of these items has a direct effect on the cost of furnishing service. Thus, the problem of providing satisfactory service at a reasonable cost is brought into focus in the design, installation, and operation of loops and station sets.

Several plans, called resistance, unigauge, and long route designs, are used in the loop plant. Application of these plans leads to the specification of cable pair wire gauges and to the economic application of electronic equipment to extend the length and/or improve the performance of loops. In general, loops are designed in bulk rather than on an individual basis. When design rules are followed, overall performance in the loop plant is satisfactory on a statistical basis. Occasionally, individual loops must be treated to improve performance because they represent extremes in the statistical distributions.

Carrier system techniques are being increasingly applied to loops to improve performance, to extend ranges, and to make more efficient use of cable facilities. Single-channel and multichannel analog systems and multichannel digital systems all have been found to be economical in various situations.

Telephone station set designs, which have been substantially improved over the years, have focused recently on the 500-type station set. Although there are now many types of station sets available, the 500-type design is sufficiently representative that it may be used to illustrate the transmission performance of telephone station equipment generally.

3-1 LOOP BASEBAND FACILITIES

A loop is defined as the connection between a station set and the switching machine in the serving central office. It includes a cable pair connection from the termination at the switching machine line circuit to the main distributing frame (MDF), a cross connection at the MDF, the loop facilities, a "drop wire" pair to extend the connection into the customer premises, a protector unit, and inside wiring or cabling at the customer premises to complete the connection from the protector unit to the station set. The loop facilities that comprise the connection from the MDF to the drop wire are the only parts of these connections that materially affect transmission.

Loop conductors are usually contained in a multipair cable which may be located overhead (aerial cable), below ground by direct burial (buried cable), or in conduit (underground cable). They may consist in part of one of several designs of paired multiple line wire or of paired open wire. In some cases, the loop facility may include an analog or digital carrier system.

Loops play a large role in transmission because two are used in every network connection. Loop facilities often share supporting structures with power lines and are thus highly susceptible to power line influence. They may be exposed to the weather and various construction activities and are thus subject to damage and abrasive effects that can result in loss of service or deterioration of performance from excessive noise, crosstalk, or other interference. Switched and nonswitched special services circuits also use these facilities and may be subject to the same impairments.

Transmission performance in the loop plant is controlled by loop cable layouts that are designed and engineered to take advantage of the statistical distribution of resistance and loss values. If the design rules are not applied, the number of limiting (high loss) loops may be significantly increased and grade of service for built-up connections may deteriorate substantially because the number of connections between high-loss loops would increase.

Where loop lengths are limited by signalling considerations, it may be possible to extend the ranges by application of signalling range extenders. However, if this is done without regard to transmission considerations, performance may suffer noticeably unless voice compensation (gain and/or equalization) is applied. The more modern electronic equipment which provides for improvements in both signalling range and in transmission performance should be used.

Loop Design Plans

The design procedures used to control the installation and use of these media are previewed here to the extent necessary to relate loop losses to the electronic equipment that can be provided to increase loop ranges and to improve performance under normal conditions [1]. Loop design plans determine the gauge of cable conductors and where and how supplementary electronic equipment may be used to increase signalling ranges or to improve transmission performance. These plans are called *resistance design, unigauge design*, and *long route design*.

The design plans have evolved as a result of efforts to satisfy economically the needs of ordinary telephone service to residential and business main station loops. The resulting network of facilities is also used to satisfy many special services circuit needs. In some cases, these needs are fulfilled without special treatment of the facilities; in other cases, treatment is required and in many of these situations, must be tailored to the specific service.

Resistance Design. When new distribution and feeder cables are to be installed, the choices of cable gauges and sizes are based on an economic analysis of the existing distribution of customer locations and the anticipated growth of the area. The design and layout of such new routes are based on a loop resistance which is known to satisfy transmission requirements. If loops in the area under study can be served by no more than two wire gauge sizes in such a way that the loop resistance design limit (1300 ohms in most cases) is not exceeded, the entire area can be served under the resistance design plan.

With resistance design, cable pairs serving the more distant customers are often loaded inductively. Design rules call for H88 loading for loops longer than 18 kilofeet; i.e., 88 mH coils are located along the line every 6000 feet. The rules specify within close tolerances the lengths of all loading sections including the end sections. In addition, the maximum allowable lengths and characteristics of bridged taps are also specified.

When loop facilities provide service to areas that have few special services needs, ancillary equipment for gain, equalization, or signalling is seldom required when resistance design rules are otherwise satisfied. However, where there is substantial demand for special services, additional loading is often installed and a variety of electronic equipment may be used to reduce loss or otherwise to improve transmission performance.

Unigauge Design. It can be shown that, in certain situations, it is more economical to provide loop plant of the same fine-gauge cable pairs (26-gauge) and to compensate for transmission and signalling limitations by the use of electronic equipment at the central office. In this unigauge design plan, the greatest economies are realized where the electronic equipment is switched into a connection as needed rather than being permanently connected in each loop requiring compensation [2].

At present, the unigauge plan can be applied only in areas served by No. 2 ESS or No. 5 crossbar switching machines. In No. 2 ESS, unigauge capability has been provided as a part of the basic design with generic programs available to cause the appropriate gain to be switched into a connection as required [3]. To achieve similar operation in No. 5 crossbar, logic wiring changes must be made, test arrangements must be modified, and additional equipment must be installed. Thus, the theoretical economic advantage of unigauge design may be negated by the additional equipment and switching system modification costs.

The unigauge plan is primarily applicable as permanently connected plant for new growth areas since interconnection points permit economical flexibility in loop extension using coarse gauge cable pairs. Additionally, the number of line and station transfers that would require central office rearrangements are limited. There are four ranges associated with the unigauge plan as shown in Figure 3-1. The shortest range, which includes loops less than 15 kilofeet long, consists entirely of 26-gauge nonloaded cable pairs. The longer ranges are shown in the figure as utilizing a combination of electronic equipment such as range extenders, inductive loading of the cable pairs, and larger gauge cable pairs (a departure from the theoretical unigauge concept). Loops from 30 to approximately 52 kilofeet long may be equipped as extended unigauge loops by using heavier (22 gauge) wire and H88 loading with the first load coil at the 15-kilofoot point rather than at 3.0 kilofeet as in resistance design.

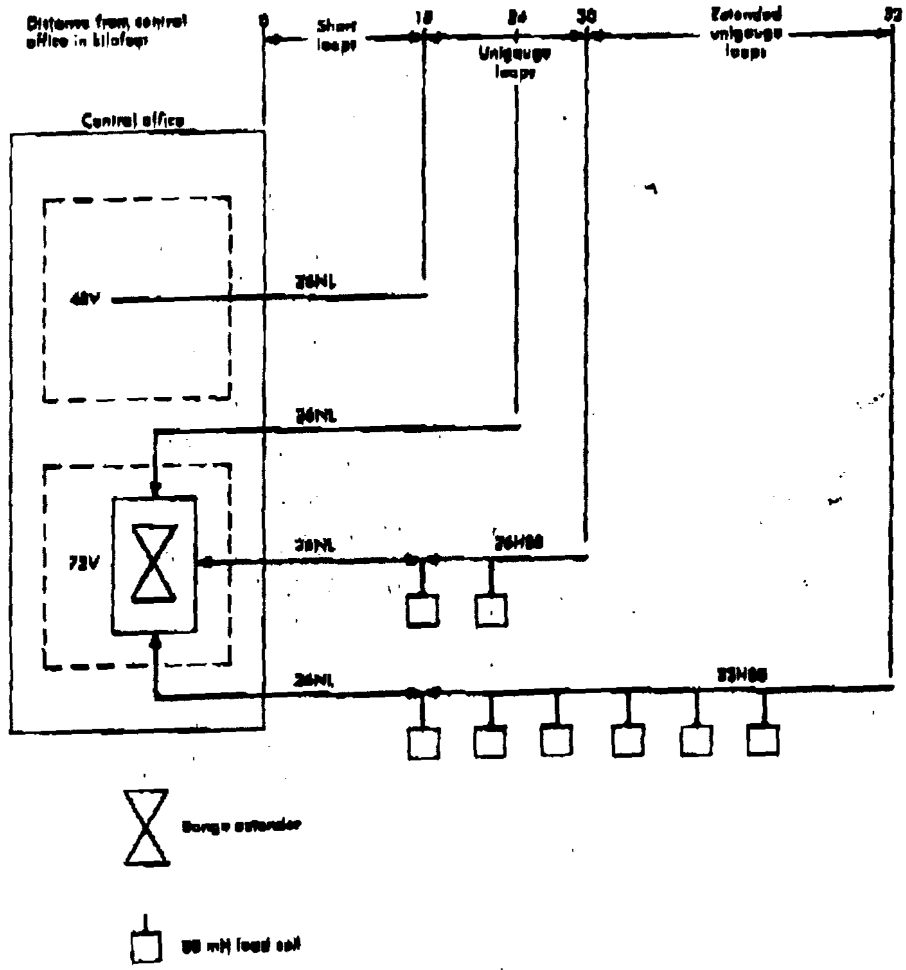

Figure 3-1. Unigauge loop plant layout.

Plant installed according to the unigauge design plan is often troublesome in respect to special services circuit design. Beyond 15 kilofeet, the unigauge loops have higher losses than loops provided under resistance design rules. These losses must often be compensated for by electronic equipment.

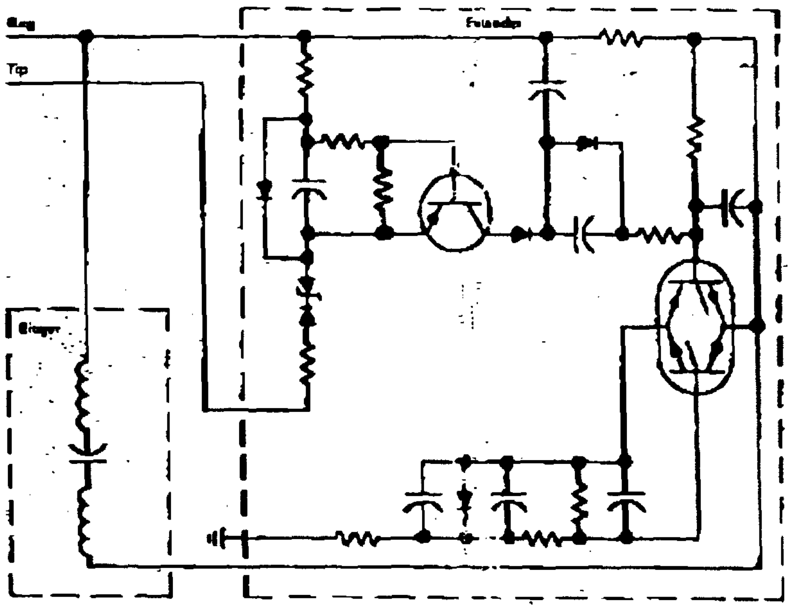

Figure 3-17. Solid-state range extender and isolator.

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CERTIFICATE OF SERVICE

I, Robin Walker, hereby certify that on this 3rd day of April, 2000, I caused copies of the foregoing attached Comments of GTE to be sent via first-class mail, postage pre-paid to the following:

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